



SC Million Solar Roofs Initiative



Summer 2004

Get in On the Action!

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The South Carolina Energy Office announces the second round of solicitations of the Public Building Solar Initiative to demonstrate solar water heating technical and economic efficiency in public facilities.

Eligible applicants will be:

- * State agencies
- * Colleges and universities
- * School districts
- * Local units of government
- * Non-profit organizations

Eligible projects are:

- * Publicly-owned residences
- * Facilities with kitchen needs
- * Facilities with shower and bath needs
- * Facilities with laundry needs
- * Facilities with swimming pool needs

The economic criteria will be:

- * Projected payback of eight years or less from savings.
- * Within categories, applications will be ranked in order of projected paybacks and in order of projected project completion dates.

The requirements of recipients will be:

- * Cost share will be 75 percent cost from SCEO and 25 percent cost from applicant.
- * Separate metering of solar water system.
- * Make installations available for periodic educational tours.
- * Allow on-site monitoring by SCEO and report operational data for a period of 10 years.

For more information on this exciting opportunity, contact Jean-Paul Gouffray of the South Carolina Energy Office at jpgouffray@energy.sc.gov or (803) 737-8038. ■



The Citadel and USC Aiken Receive Solar Grants

In January, the South Carolina Energy Office solicited projects for the first Public Building Solar Grant Initiative. Eligible institutions included state agencies, public colleges and universities and public school districts. Projects were to demonstrate the cost-effectiveness of solar water heating in the following types of facilities: publicly-owned residence; facility with kitchen hot water needs; facility with shower and bath hot water needs; facility with laundry hot water needs; and facility with swimming pool needs.

Two projects were awarded. The Citadel received a grant in the amount of \$25,000 for a solar water heating installation on faculty and staff housing at Dunnemann Apartments. The University of South Carolina at Aiken received a \$25,000 grant for the installation of a solar heating system at a new indoor swimming pool. ■



UNIVERSITY OF
SOUTH CAROLINA
AIKEN

Furman University's Thermal Solar System is Twenty Years Old

By Jeff P. Redderson, Frank M. Powell, and Phill Simpson, Furman University

During the era of federal alternative energy grants of the early 1980's, Furman University successfully obtained a \$45,000 matching grant to install a thermal solar system. In what may be the largest such system in South Carolina, sixty 4' x 10' flat plate, fixed orientation, south facing panels were installed on the 11 year old Herman W. Lay Physical Activities Center in 1984. The drain back system (no chemicals needed to prevent freezing) preheats the hot water systems used in the swimming pool, diving well, and shower areas. Producing up to 185 degree water, the system can transfer 37,100 Btu/hr/day/collector of energy from the sun.



This south-facing collector array sits atop the Physical Activity Center.

A best estimate of the cost savings during the nearly 20 years of system operation is approximately \$9,000 per year. An exact dollar savings calculation is difficult because of the fluctuating costs of natural gas and electricity rates during this period. Here is look at payback data that includes completed and projected maintenance costs.

Installation costs (\$45,000 grant, \$45,000 cost share)	\$90,000
Yearly savings in electricity and gas	<u>\$9,000</u>
Gives a return on investment 1984 - 1994	10 years
1994 - 2004 positive cash flow for Furman University	\$90,000
2004 - 2005 maintenance and upgrading of system to include exterior piping insulation replacement	\$400
Relining solar water exchange tank/refurbishment of 16 solar panels in 2004	\$30,000
Projected costs of solar panel refurbishment, pump motor replacement/rebuilding, and electronics upgrading in 2005	<u>\$15,000</u>
Total	\$45,400
Yearly savings in electricity and gas	<u>\$9,000</u>
Gives a return on investment for upgrade	5.04 years

The Btu output of the system is declining because of tree growth.



We expect that the solar system will operate maintenance free for 10-20 more years. The Btu output of the system is declining because of tree growth. However, with projected increases in electricity and natural gas costs, there should be no decline in dollar savings.

Finally, Furman University is an educational institution dedicated to providing the best liberal arts education available. How to make energy from the sun is an important lesson that is often overlooked in the educational system of the United States. We hope that the success of our large solar installation extends well beyond the dollars saved and may be considered important in the quality of the education our students receive. ■

Joe Martin's Farm in Pickens County

By Ross Stewart, U.S. Department of Agriculture - Natural Resources Conservation Services

Joe Martin's cattle farm is similar to most operations throughout rural America. His cattle continuously grazed a fifty acre pasture. Water is supplied by a stream on the back side of the pasture.

This presented several problems. Continuous grazing is the least efficient method. Cattle over-graze certain areas, which often leads to erosion. During the summer months, over-grazed areas are close to water sources. This creates channel bank deterioration and increased fecal coliform counts in streams.

Joe Martin took several steps to solve the dilemma. First, he committed to a more efficient rotational grazing system. Cross fencing was planned that provided for three pastures. A central location was picked to provide livestock water for all pastures.

As often happens, one solution introduces additional challenges. With the creek location over 1,500 feet from the designed pasture system, water delivery presented a problem. Compounding the problem was the absence of conventional electric power.

A solution was found by using photovoltaic solar power. Solar panels were located on a hill above the creek. Manhole sections were buried beside the creek channel to create a reservoir. A high efficiency, low-volume pump using energy from the sun pumps water to a centrally located 1,500-gallon stock tank. Another tank gravity-feeds from the 1,500 gallon tank to supply water to another stock tank in a lower pasture.

While the initial cost of Martin's new watering system are significant, the long term benefits are continuous:

- ★ Controlled grazing allows for increased stocking rates, allowing more cattle to graze.
- ★ Rotating cattle allows more grass growth, and recovery periods after grazing are shorter.
- ★ Stream water quality is improved by reduction in fecal coliform and sediment.
- ★ Manure is deposited on the land where nutrients can be utilized to grow forage.
- ★ Health hazards are reduced for livestock.

The 2002 Farm Bill made provisions to offset the cost of innovative systems to reduce livestock's use of streams. A cost share program is in place to provide up to 50 percent of the actual cost of a system. Components might include fencing, watering tanks, pipelines, pumps and gravel for heavy use around tanks. ■

For Your Information...

The South Carolina Energy Office has contracted with York Technical College for assistance in educating the public on solar energy technologies and the Million Solar Roofs Initiative. York Technical College will develop a brochure on financing options for solar, construct a solar exhibit and model solar home for use at trade shows, and provide technical experts for trade shows and presentations. The solar display can be reserved for use at your seminar or trade show. Contact D'Juana Wilson at (803) 737-1706 or at dwilson@gs.sc.gov for display availability. For updates, visit our website at www.energy.sc.gov. Click on the Sustainability and Renewable Energy link, then proceed to SC Million Solar Roofs Initiative. ■



Farmer Joe Martin of Pickens County and Obadiah Mwezi of Tabelrock Technologies, LLC installers of the PV system, stand in front of the gravity-fed watering trough and solar array.

Move to a Virtual Sustainable Community

The South Carolina Sustainable Universities Initiative, the SC Department of Commerce and the South Carolina Department of Health and Environmental Control are collaborating on the construction of a "virtual community" of South Carolina businesses, agencies and organizations with an interest in sustainability. Although the site is still under development, it can be viewed at <http://www.sc.edu/sustainable/SCSNew/index.html>.

Please send your comments, additions and suggestions to Trish Jerman at jerman@sc.edu or Karen Owens at kowens@commerce.state.sc.us. We want to hear from you! ■

Farmer Uses the Sun to Water Cattle

By Ross Stewart, U.S. Department of Agriculture - Natural Resources Conservation Services

R.D. Morrison, a rancher in the Upstate, was looking for a better way to water his cattle. His cows were drinking from a stream. With the help of USDA (U.S. Department of Agriculture) and NRCS (Natural Resources Conservation Service), he was able to put in place a system to better his situation with the help of solar. This made it possible to fence the cattle away from the stream.



R.D. Morrison and his son install the PV system.

The system uses a Dankoff solar ETA pump system and was supplied and installed by Tablerock Technologies, LLC and Morrison. It has a submersible pump in a 370-foot well. Water is pumped into a 1500-gallon storage tank during daylight hours. The water is fed to watering troughs in paddocks on the farm. The paddocks make the farm able to grow more cattle per acre, as opposed to previously-used methods, by controlling grazing. This makes the grass able to replenish quicker and with fewer problems for the ranchers.

Morrison was able to streamline his operation and increase his bottom line by the use of solar water pumping. This system is solar only, which means he pumps only during daytime; the 1500-gallon tank serves as a reservoir for evenings and rainy days when the pump is not running. The system is fully automated and highly reliable.

These type systems are becoming very popular among farmers for the many advantages they offer. They improve the quality of meat by giving cattle very clean drinking water. Getting the cattle out of streams and ponds reduces injury to the cattle. Paddock grazing with point of use water supply increases weight and gives the rancher an economic advantage. The meat achieves better quality, which is very positive for consumers. This is

PV solar array on the barn roof.



an excellent method of ranching by including the latest technology in alternative energy. ■

Make Your Opinion Count

The South Carolina Energy Office is in the process of helping form the South Carolina Solar Energy Society. This group will play a major role in promoting incentives for solar, as well as assisting in the education and marketing of solar in South Carolina.

If you are interested in becoming a member, please contact Jean-Paul Gouffray at (803)737-8038 or at jpgouffray@gs.sc.gov, or D'Juana Wilson at (803) 737-1706 or dwilson@gs.sc.gov.

If you have any comments or suggestions about the SC Million Solar Roofs Initiative, please share those with us. We welcome your ideas on how to get the word out on solar. ■



Solar Power Proves its Worth



This ten collector array sits atop the roof of the Williamsburg County Jail in Kingstree, SC.

Williamsburg County taxpayers have saved over \$30,000 in utility bills thus far as a result of a 1990 South Carolina Energy Office project to install a solar water system at the county jail facility in Kingstree. And the savings keep on rolling.

The Energy Office awarded a grant to Williamsburg County in 1990 to install an active solar water heating system with thermal storage on the Williamsburg County Jail. The 10-collector array was installed to pre-heat 500 gallons of water for the showers and bathrooms of this 180-bed facility.

Recently, Energy Office staff visited the installation, and determined that because of staff turnover in past years, the system needed servicing and new personnel needed training. SCEO then hired technicians to provide these services.

With the system back at peak performance, water temperatures readings are rising to above 130° F.

This system is providing one-third of the hot water needed at the facility, saving the county over \$2500 annually. According to SCEO solar specialist Jean-Paul Gouffray, "With proper maintenance, these systems hold up real well. I fully expect the Williamsburg system to provide another \$30,000 in cost savings to taxpayers, and more." ■

Rebates for Solar in New Construction

The South Carolina Energy Office is developing a program to encourage installation of solar water heating in new energy efficient buildings.

Builders of commercial and institutional facilities that qualify for LEED (Leadership in Energy and Environmental Design) certification will be entitled to \$2000 rebates for installation of solar water systems, as long as funds last.

EarthCraft-certified home builders will be entitled to \$1000 rebates, subject to funding limitations.

For more information about these two programs, keep an eye on the South Carolina Energy Office website (www.energy.sc.gov), or contact Sonny DuBose at (803) 737-8030, or sdubose@gs.sc.gov. ■

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